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3 A FLUORESCENT LAMP AND METHOD
4 FOR ATTACHING A BASE MEMBER TO AN END OF SAME
5

6 BACKGROUND OF THE INVENTION

7 1. Field of the Invention

8 The invention relates to fluorescent lamps, and is directed
9 more particularly to a base for such lamps.

10 2. Description of the Prior Art

11 In the manufacture of lamps, a lamp envelope is usually
12 provided with at least one base. Generally, a lamp base
13 comprises a rigid shell secured to an end portion of the lamp
14 envelope. At least one insulating disk is fixed in the shell for
15 carrying one or more hollow base pins, or contacts, into which
16 the lamp lead wires are electrically secured. The lamp is
17 supported by one or more holders, or sockets, into which the lamp
18 bases extend for communication with a source of electrical
19 energy.

20 Typically, such lamp bases are secured to the end portions
21 of the lamp envelope by means of a cement which is applied to the
22 inside surface of a base shell annular wall. A sufficient
23 quantity of cement is used to fill a gap between a lamp seal and
24 the annular wall of the base. During manufacturing, each base is
25 first fitted loosely onto a respective end portion of the lamp
26 envelope. Thereafter, the cement is cured, as by heating, which
27 allows the base to adhere to the lamp bulb and withstand industry
28 torque requirements.

1 While the above technique of securing the lamp base by means
2 of a suitable cement has been employed successfully in many lamp
3 families, including fluorescent, it has been found that certain
4 disadvantages exist. For example, the cement not only adds cost
5 to the lamp but also requires the need for a separate process of
6 applying the raw cement to the base shell. Moreover, while
7 present manufacturing facilities using such a technique are
8 equipped with machines which dispense cement, the machines
9 require constant monitoring and periodic mechanical and
10 electrical maintenance. Another disadvantage is the curing
11 process of the cement, wherein indirect natural gas flame heat is
12 used to cure the basing cement after the base is fitted to the
13 end of the lamp. The temperatures required to cure the cement
14 sometimes cause damage in the seal area of the lamp envelope. In
15 addition, the machinery needed to provide the heat for curing not
16 only requires periodic maintenance but also takes up valuable
17 floor space in the production line.

18 Various alternatives for securing the base to the lamp end
19 with little or no cement, or other type of adhesive, have been
20 proposed in the past. For example, U.S. Patent No. 2,993,191,
21 which issued on July 18, 1961 to Pietzsch et al, discloses a base
22 for an electric discharge lamp wherein the base is constructed
23 from resin having a modulus of elasticity which is greater than
24 5,000 kg./cm.² and as high as about 19,000 kg./cm.². The resin has
25 a breaking dilation of more than 50% and as high as about 230%
26 and has an initial softening temperature of as low as about 150°
27 Celsius and as high as about 210° Celsius. In one embodiment,
28 the base of Pietzsch et al is positioned with the annular wall

1 adjacent to the trough of a bulb end which has been heated to
2 about 330° to 350° Celsius. As a result, the base material melts
3 and occupies the trough or channel and, by reason of the
4 character of the material of which the base is composed, adheres
5 to the surface of the glass bulb. Alternatively, the base may be
6 pressed against the bulb end to cause an annular rib or
7 reinforcement to snap over the bead or rim and into a trough or
8 channel of the bulb without heating the bulb neck.

9 U.S. Patent No. 4,221,453, which issued to Wagener on
10 September 9, 1980, discloses a base for a fluorescent lamp. The
11 base comprises a frontal portion, contact pins electrically
12 connected to the connecting wires, at least one drop of glue
13 which dries at room temperature, and an annular wall extending
14 circumferentially from and perpendicular to the frontal portion.
15 The annular wall has at least two equally circumferentially
16 spaced knobs protruding inwardly. The base is formed from an
17 elastic, bendable thermoplastic material so that when the base is
18 fitted to the tube over the end portion, the annular wall
19 elastically deforms and the knobs slide over the collar and snap
20 into the groove of the lamp end portion. To safeguard against
21 rotary movement of the base relative to the bulb, the base is
22 formed with radial ribs to be disposed in notches provided in the
23 bulb neck.

24 U.S. Patent No. 5,432,400, which issued July 11, 1995 to
25 Spaulding et al, discloses a lamp including a glass envelope
26 having a base fitted at each end portion thereof. Each lamp base
27 includes a metallic base shell having an annular flange. The
28 annular flange is heated prior to fitting over the end portion of

1 the envelope so as to increase the inner flange diameter.
2 Cooling of the annular flange after fitting reduces the flange
3 diameter, thereby providing an interference fit with the end
4 portion. The lamp base is retained on the end portion without
5 the need for basing cement. In order to accommodate variations
6 in the diameter of the lamp seals, an annular rib is formed on
7 the inner surface of the flange. After cooling, the annular rib
8 forms an interference fit with the lamp end portion.

9 While the bases described in the above patents appear to be
10 satisfactory from a functional standpoint, it is believed that
11 unanticipated production and/or other related problems, as well
12 as material cost, may explain why such bases have not been
13 commercially successful. Accordingly, it is deemed advantageous
14 to provide another viable alternative.
15

1 shell member, to fix the base shell member on the envelope end
2 portion.

3 In accordance with a still further feature of the invention,
4 there is provided a fluorescent lamp comprising a glass envelope
5 having an end portion and a base shell member of a cup-shape
6 configuration adapted to engage the envelope end portion. A
7 collar of wrap material is disposed around the envelope end
8 portion and sides of the base shell member, an adhesive is
9 disposed on an interior surface of the collar, the adhesive being
10 contiguous with the glass envelope end portion and the base shell
11 member, to fix the base shell member on the envelope end portion.

12 In accordance with a still further feature of the invention,
13 there is provided a method for attaching a base member to an end
14 of a fluorescent lamp glass envelope, the method comprising the
15 steps of providing an annular end portion on a wall portion of
16 the glass envelope, pressing a base shell member of a cup-shape
17 configuration onto the end portion of the envelope, and applying
18 a collar of wrap material to the envelope end portion and the
19 base shell member, the wrap material having an adhesive on an
20 interior surface of the collar, to fix the base shell member on
21 the envelope end portion.

22 The above and other features of the invention, including
23 various novel details of construction and combinations of parts
24 and method steps will now be more particularly described with
25 reference to the accompanying drawings and pointed out in the
26 claims. It will be understood that the particular devices and
27 method steps embodying the invention are shown by way of
28 illustration only and not as limitations of the invention. The

1 principles and features of this invention may be employed in
2 various and numerous embodiments without departing from the scope
3 of the invention.

4
5 BRIEF DESCRIPTION OF THE DRAWINGS

6 Reference is made to the accompanying drawings in which is
7 shown an illustrative embodiment of the invention, from which its
8 novel features and advantages will be apparent.

9 In the drawings:

10 FIG. 1 is a side elevational, partly sectional, view of an
11 end portion of a fluorescent lamp, showing one form of base
12 member attachment to the lamp envelope, illustrative of an
13 embodiment of the invention;

14 FIG. 2 is similar to FIG. 1, but illustrative of an
15 alternative embodiment;

16 FIGS. 3 and 4 are exploded perspective views of the
17 components of the base member attachment means of FIGS. 1 and 2;
18 and

19 FIG. 5 is a perspective view of the assembled components of
20 the base members attachment means of FIGS. 1 - 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, it will be seen that a fluorescent lamp 10 comprising a tubular vitreous or glass envelope 12 is provided with an inner coating of phosphor 14 and is hermetically sealed at each end by a glass mount 16. Each mount 16 includes a stem press 18 within which a pair of lead wires 20 are sealed. A thermionic electrode 22 is mounted on the inner ends of lead wires 20 within the tubular glass envelope 12. Each thermionic electrode 22 comprises a tungsten coil coated with an emissive material of alkaline earth oxides.

In accordance with standard lamp-making practices, the envelope 12 is filled with a suitable starting gas and doped with mercury to provide an ionizable medium within the sealed envelope, which permits an electric discharge to pass between the thermionic electrodes.

Each end portion 24 of the lamp envelope 12 may include an annular groove 34 which terminates at an annular rim or seal 38. Each of the sealed end portions 24 of envelope 12 is fitted with a base 30 that includes a pair of axially-extending metal base pins 32, or other form of contacts, which serve as terminals for the lamp 10 and are adapted, by virtue of their spacing and dimensions, to permit the lamp to be inserted into the socket components of a lighting fixture and be operated from a suitable electrical power supply. Each lead wire 20 extends through the stem press 18 in mount 16 to a respective metal base pin 32.

Base 30 includes a metallic base shell 42 having an annular flange 44. When the base 30 is secured to the lamp end portion in a manner to be described below, an inner surface 40 of the

1 annular flange 44 contacts the lamp end portion 24 and when the
2 end portion includes the seal 38, contacts the annular seal 38.
3 Base shell 42 is formed of a suitable metal, such as aluminum.
4 The base shell 42 may be provided with an inwardly-directed
5 annular ridge (not shown) for engaging the groove 34.

6 A disk 46 of insulating material is secured to base shell
7 42. The base pins 32 are received in registering apertures
8 formed in the insulating disk 46. Each of the base pins 32 is
9 provided with a flange portion 48 engaging the lower surface of
10 disk 46, the base pin inner ends being swaged or riveted into
11 contact with the upper surface of disk 46, thus rigidly securing
12 the pins in position.

13 While the base 30 is shown including two base pins, any
14 number of pins may be used depending upon the type of lamp.
15 While only one insulator disk is used in the base illustrated,
16 each base pin may be mounted on separate insulating disks.

17 To secure the base shell 42 to the envelope 12, the base
18 shell member 42 is pressed onto the end portion 24 of the
19 envelope 12. A collar 60 of shrink wrap material is fitted
20 around the annular end portion 24 of the envelope 12, and around
21 the flange 44 of the base shell member 42. The collar 60 is
22 shrunken, as by the application of heat, to compress against the
23 envelope end portion 24, and the base shell member flange 44, to
24 urge the shell member flange 44 against envelope end portion 24,
25 including the seal 38, if present, to fix the base shell member
26 42 on the envelope end portion 24.

27 Alternatively, or in combination with the above, the collar
28 60 may be provided with a layer of adhesive 62 (FIG. 2) on an

1 interior surface 64 thereof. In this embodiment, the collar 60
2 is adhered to the glass envelope end portion 24 and the base
3 member flange portion 44, with which the adhesive 62 is
4 contiguous, to fix the base shell member 42 on the envelope end
5 portion 24. The adhesive 62 may be heat curable, in which case
6 the adhesive is cured by the application of hot air, or the like,
7 to bond with the envelope end portion 24 and the base shell
8 flange 44 to fix the shell member 42 on the glass envelope end
9 portion 24.

10 There is thus provided a fluorescent lamp in which a base
11 member is fixed to a lamp envelope end portion in a manner and by
12 way of a method requiring little machinery, and reduced time and
13 costs relative to prior methods.

14 It will be understood that many additional changes in the
15 details, materials, steps and arrangement of parts, which have
16 been herein described and illustrated in order to explain the
17 nature of the invention, may be made by those skilled in the art
18 within the principles and scope of the invention as expressed in
19 the appended claims.